



NVIDIA MAXIMUS EMPOWERS ARTISTS AT ANATOMICAL TRAVELOGUE

ANATOMICAL TRAVELOGUE CASE STUDY

Anatomical Travelogue (AT) is an award-winning producer of visually rich medical videos, using cutting-edge technology to create awe-inspiring images from deep inside the human body. Each high-end 3D visualization is produced using actual data acquired from MRIs, CT scans, electron microscopy, and other medical imaging technologies. AT owns the largest 3D library of real, segmented human data in the world, from the molecular level up through cells, organs, and systems. AT's clients include scientific corporations, research institutes, pharmaceutical and media companies.

Clients rely on Anatomical Travelogue to deliver highly realistic medical imaging, work that requires computationally-intensive simulations. These simulations often involve volume (voxel) rendering of 3D anatomical data combined with animations illustrating anything from how a drug flows through the body to a bacterial study. These videos are often used as sales tools by drug companies, or as a way for doctors to describe internal medical procedures to patients.

CHALLENGE:

To create work at this level of accuracy and detail, AT's team of 25 artists requires a workflow methodology that allows true interactivity and the ability to tweak their projects in real time. The team's typical process involves importing, modifying and preparing 3D data in Autodesk 3ds Max, setting up lights and materials and render out simulations in Chaos Group's V-Ray RT, and composite effects and animations into a seamless clip using Eyeon Fusion.

"Our workflow is very interactive, except when we were sending files out to the GPU using Fusion and V-Ray RT," explained Anatomical Travelogue, Director, R&D, Chad Capeland. "When the GPU was working, I could barely open up a text editor because the display was so unresponsive. It would freeze up a whole system, and was frustrating for artists to have to sit around and wait."



Influenza A virus

Anatomical Travelogue needed to find a way to leverage the workflow efficiencies enabled built-in GPU acceleration tools in Fusion and V-Ray RT, without having those operations take over their entire workstation, bringing overall productivity to a halt.

SOLUTION:

A longtime NVIDIA user, Capeland began looking at NVIDIA's Maximus technology as a promising solution to AT's productivity challenges. Offering a dual-GPU configuration of a Quadro K5000 and a Tesla K20, Capeland predicted that Maximus could help eliminate bottlenecks by having one GPU dedicated to graphics and one to computing. Capeland believed that the results would bring AT's workflow to the next level.

“The more you load onto just one GPU, it ultimately affects the performance,” explained Capeland. “The idea behind Maximus is that if you let the graphics exist on one GPU and let all the computing tasks exist on the other GPU, it should provide a division of labor where one card runs your regular desktop experience while the other card runs your render and graphics processing, which should drastically improve your workflow. We installed Maximus, and that’s exactly what happened.”

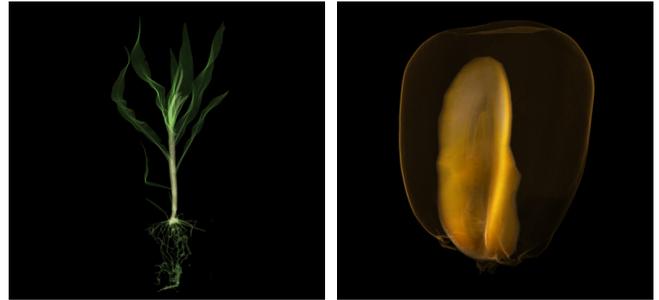
Maximus immediately improved Fusion’s performance, and AT’s overall workflow. Applications demonstrated better interactivity and responsiveness, and users could simultaneously process and render data on the dual GPUs – tasks that previously had to be completed one at a time. This allowed artists to make aesthetic changes while data is still processing, freeing them up to experiment more without experiencing rendering delays.

“Maximus allowed Fusion to truly run as intended – as a real time, interactive experience with no hiccups at all,” said Capeland. “That reliability, fluidity, and the ability to give real time interactive feedback is absolutely critical for us. Before, we were afraid to try things because it would take too long to render, which would take us totally offline. Now that’s not a concern, so I can explore more options and ultimately get higher quality results for our clients.”

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IMPACT:

Anatomical Travelogue is currently working on a series of short films that visualize various plant species from microscopic CT scans and nuclear imaging. The project involves extensive amounts of volume rendering based on a 3D voxel array of a given plant. The project also requires texture sampling, noise reduction, fragment shaders, filtering, and more in Fusion. “Doing this type of work on Maximus is just so incredibly smooth, and unbelievably

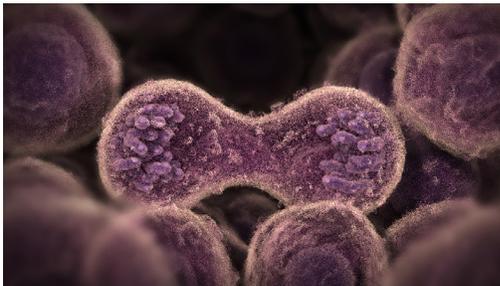


CT scans of corn seedling and kernel

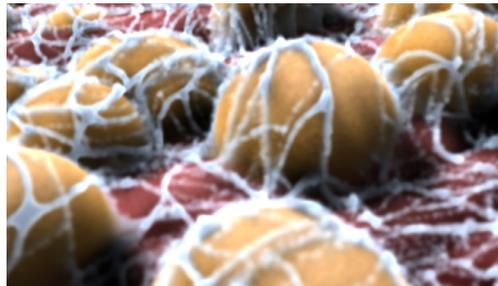
fast,” said Capeland. “The renders are streamlined, volume rendering is much faster, and we can adjust parameters and immediately see results. For so long we had struggled with the unwanted side effects of working in a graphics environment. We never thought to put two GPUs in a single machine, but once we tried Maximus it just solved everything. It has empowered our artists so much – they swear by it.”

Capeland continued, “With Maximus and the dual GPUs, we never have to worry about task switching. We can always stay on GPU compute because there’s no penalty on interactivity. I’ve never had to fall back to the CPU; my GPU just does not slow down. It’s like running on a CPU, where everything is responsive and everything works like it should, but it’s so crazy fast. That’s all just one less thing for an artist to worry about. It’s a refreshing way of working where you can look at your image and do what you’re supposed to be doing rather than worrying about internal task scheduling – everything just works so efficiently and so reliably that you can stay focused on your shot and not worry about the operations behind it. You can simply work better.”

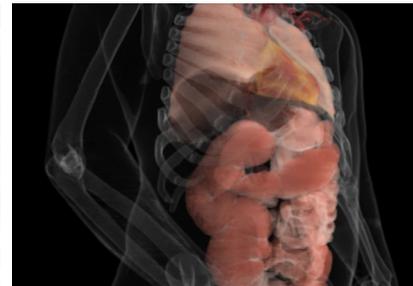
Switching to Maximus has paid off for Anatomical Travelogue in spades and the ROI continues to grow as artists have more flexibility to broaden their aesthetic choices and simply try new things without being punished by slow system performance. “Ultimately Maximus is an extremely cost-effective way of getting more performance out of your desktop,” concluded Capeland. “All you have to do is drop in a second card, hit a checkbox for some drivers, and you instantly get a 30-40% performance increase and true interactivity. The productivity improvements we’ve experienced far exceed the investment in a second GPU.”



Lymphocyte undergoing mitosis



Adipocytes and collagen fibers



Human trunk

To learn more about NVIDIA Quadro, go to www.nvidia.com/quadro

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